

# **TANDBERG VIKING FS-1600 NAS APPLIANCE**

## **Hardware User Manual**

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Part No. 65 82 B7 - 01  
January 2008

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Part No.	Title
6582X2	Tandberg Viking Series Storage Server Administration Manual

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We would appreciate any comments on this publication.

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# 1. *Overview*

## 1.1. Package Contents

The Tandberg Viking FS-1600 Series NAS Appliance comes with the following items:

- Viking FS-1600 Series NAS Appliance (1)
- AC power cord (1)
- Rackmount kit (1 set)
- OS Recovery DVDROM / Documentation CDROM (2 discs)

### Notes

If any of the items above are damaged or missing, contact your dealer immediately. Save the packaging box and materials for future transportation use.

## 1.2. Features of Viking FS-1600 Series NAS Appliance

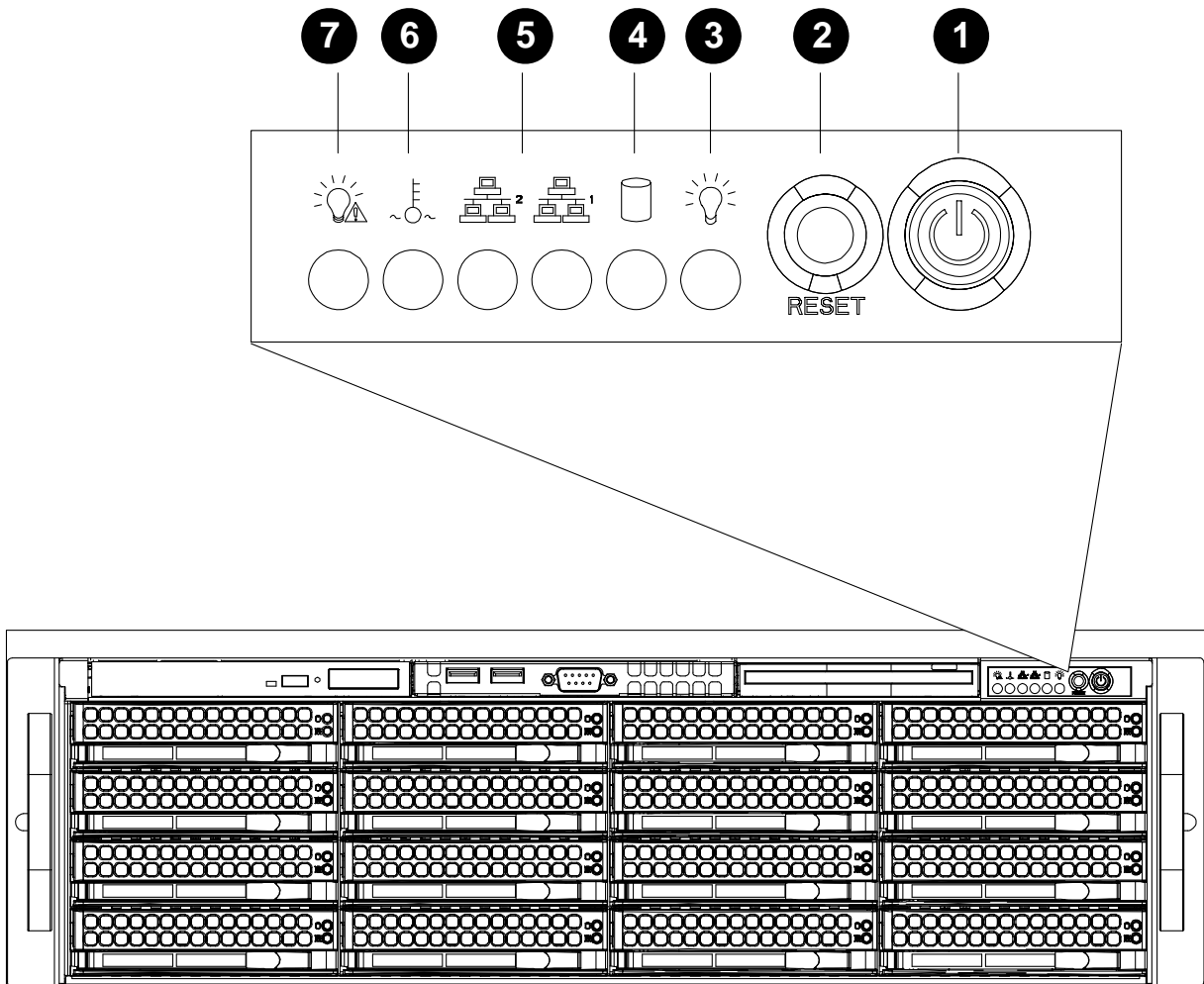
The Viking FS-1600 Series Network Attached Storage appliance is a powerful rack-mountable system that offers a new standard for flexible management and monitoring networked attached storage by the network administrators. The hardware features include the followings:

- Processor:
  - Viking FS-1600 uses dual 771-pin LGA Sockets that supports 2 x 64-bit Dual-Core Intel® Xeon® 1.60 GHz processor with 1066 MHz FSB and 4MB L2 Cache (5110)
  - For Viking FS-1610 uses dual 771-pin LGA Sockets that supports 1 x 64-bit Quad-Core Intel® Xeon® 2.00 GHz processor with 1333 MHz FSB and 12MB L2 Cache (E5405)
- Intel 5000V (Blackford VS) chipset
- 2 x Intel® (ESB2/Gilgal) 82563EB Gigabit Ethernet Controller which supports 10BASE-T, 100BASE-TX, and 1000BASE-T, RJ45 output with Intel® I/OAT for fast, scaleable, and reliable networking
- Memory:
  - 6 x 240-pin DIMM socket that accept a maximum memory capacity of 16GB 667 / 533 MHz DDR2 ECC FB SDRAM modules (Memory modules must be populated in pairs)
  - Default RAM configuration for FS-1600 is 1GB and FS-1610 is 2GB
- Expansion slots:
  - 1 x (x8) PCI-e slot
  - 1 x (x4) PCI-e slot (using x8 slot)
  - 2 x 64-bit / 100 MHz PCI-X (3.3V) slot
  - 1 x 32-bit / 33 MHz PCI (3.3V) slot
- RAID:
  - FS-1600 uses Areca ARC-1160 Serial-ATA II RAID controller with 256MB RAID cache which supports RAID level 0, 1, 0+1, 3, 5 and 6 (consume one PCI-X slot)
  - FS-1610 uses Areca ARC-1261ML Serial-ATA RAID controller with 256MB RAID cache which supports RAID level 0, 1, 0+1, 3, 5 and 6 (consume one x8 PCI-e slot)
- Storage support for:
  - Up to 16 x hot-swap Serial-ATA II hard-drive bays
  - Up to 16 x hard-drive with RAID configuration
- Front control panel
  - Power button
  - Reset button
  - 1 x Fast UART 16550 serial port
  - 2 x USB 2.0 port

- Rear panel connectors
  - 1 x PS/2 keyboard port
  - 1 x PS/2 mouse port
  - 1 x Fast UART 16550 serial port
  - 1 x HD-68 Ultra320 SCSI port
  - 1 x VGA port
  - 1 x ECP/EEP parallel port
  - 2 x RJ45 LAN port
  - 2 x USB 2.0 port
  
- 2 x Redundant Power Supply Unit (Total 800W)

The Tandberg Viking FS-1600 Series NAS appliance is fully compatible with Microsoft Windows Storage Server 2003.

### 1.3. Front Panel



1. **Power button**  
Button that turns the FS-1600 Series on or off.
2. **Reset button**  
Button that reset the FS-1600 Series.
3. **Power LED**  
Lights up green when power is on.
4. **HDD Activity LED**  
Indicates HDD activity by flashing LED.
5. **LAN Access LED indicator**  
Indicates LAN status and activity of LAN1 and LAN2 Ethernet controllers.
6. **Over temperature LED indicator**  
Indicates if FS-1600 Series is overheated (continuously on) or fan failure (flashing).



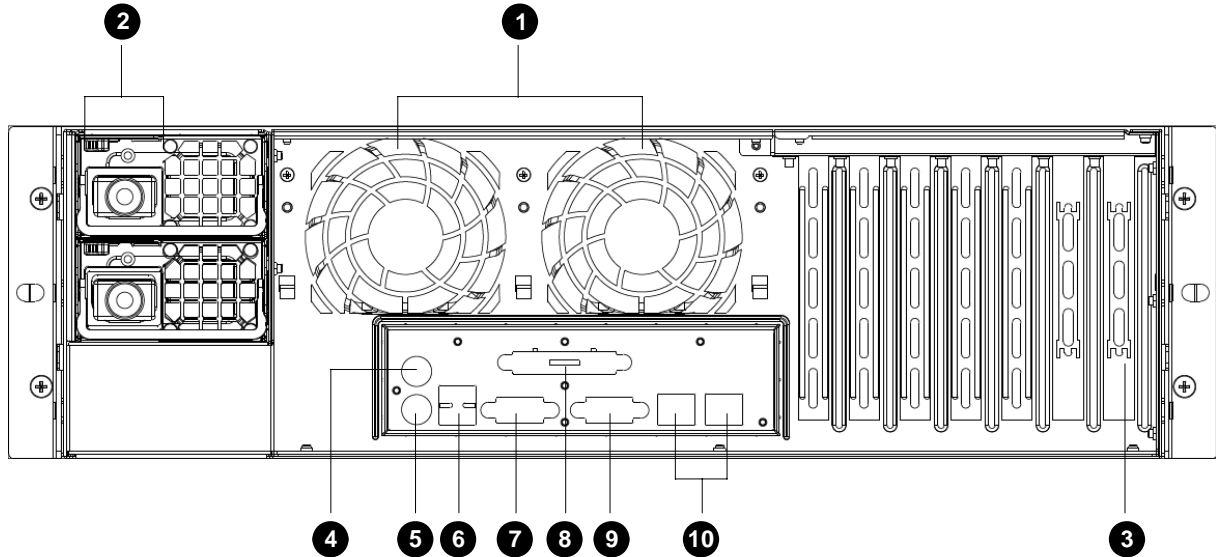
## 7. Power Supply Unit Failure LED

Indicates if one or more power supply units have failed.

## 1.4. Front Panel LED Indicators

LED	Colour	State	Meaning
Power	Green	On	FS-1600 Series NAS is on.
		Off	FS-1600 Series NAS is off.
HDD	Green	Off	No hard-drive activity or no hard-drive is connected or.
		Blink	Hard-drive activity.
HDD (Fault)	Amber	On	Hard-drive is faulty.
		Off	Hard-drive is in normal state.
LAN	Green	On	Network link is established.
		Blink	Network link is established and LAN activity.
		Off	No link is established and cable could be faulty.
Over Temp	Red	On	FS-1600 Series is overheated.
		Off	FS-1600 Series is in normal condition.
		Blink	One or more the system fans failure.
Power Fault	Red	On	One or more PSU have failed.
		Off	All PSU is in normal conditions.

## 1.5. Rear Panel



1. **Fan**  
Cools the FS-1600 Series. Blocking the ventilation may result in overheating.
2. **Power supply connector**  
Plug the power cord to into this connector.
3. **HD-68 pin Ultra320 SCSI connector**  
Connector for external SCSI device.
4. **PS/2 mouse connector**  
Connector for PS/2 mouse device.
5. **PS/2 keyboard connector**  
Connector for PS/2 keyboard device.
6. **USB connectors**  
Connectors for USB devices.
7. **RS232 serial connector**  
Connector for UPS for other serial port device.
8. **Parallel connector**  
Connector for printing device.
9. **VGA console connector**  
Connector for a console monitor.
10. **LAN connectors (LAN1 & LAN2)**  
RJ45 connectors for 10/100/1000 Base-T/X networks.

## 1.6. Rear Panel LED Indicators (LAN)

LED	Green	Orange	Meaning
LINK-ACT	On	-	Network link is established.
	Blinking	-	Activity in network link.
	Off	-	No link or cable faulty.
Speed	On	Off	Network links is established and operating at maximum speed.
	Off	On	Network links is established and operating at 100 Mbps speed.
	Off	Off	Network links is established and operating at 10 Mbps speed.

## 1.7. Storage

The Viking FS-1600 Series NAS appliance is equipped with the following storage devices connectivity:

- DVD-ROM drive
- High-capacity Serial-ATA I or II hard disk drive

### 1.7.1. DVD-ROM Drive

The DVD-ROM drive allows installation of additional software and recovery of the OS image to the factory default level using the accompanied OS Recovery Disc.

#### Notes

Keep the Recovery Discs in a safe place when not in use to avoid scratches or other damage. Any kind of dirt or damages can affect the data on the disc or stop the drive from reading properly.

In case of emergency or in the event when there is no power to the FS-1600 Series NAS appliance, a stuck disc can be retrieve by inserting a straightened paper clip in to the eject slot.

### **1.7.2. Hard Disk Drives**

The Viking FS-1600 Series NAS came supports four hot-swap Serial-ATA I or II hard drives with the capability of configuring into various RAID (Redundant Array of Independent Disk) settings.

Depending on your model of the FS-1600 Series NAS, they come with either Areca ARC-1160 (FS-1600) or ARC-1261ML (FS-1610) Serial-ATA II RAID controller to support the Serial-ATA hard drives.

When configured correctly, the FS-1600 Series NAS appliance can provide non-stop service with a high degree of fault tolerance through the use of RAID technology and advance array management feature. The hard drives can be configured to RAID level 0, 1, 0+1, 3, 5 or 6.

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# 2.

## *Setting Up*

### 2.1. Requirements

When planning a site to house the Viking FS-1600 Series NAS appliance, you may want to consider requirements for power and network availability, as well as a space with well regulated temperature and humidity that is relatively free of dust and other airborne contaminants. If your installation calls for placement on a table top, apply the supplied rubber feet to the bottom of the chassis.

Before unpacking and installing the FS-1600 Series NAS appliance, select a suitable installation site for maximum efficiency. Consider the following factors when choosing a site:

- Near a grounded power outlet
- Clean and dust-free
- Sturdy surface free from vibration
- Well-ventilated and away from sources of heat
- Protected from electromagnetic fields produced by electrical devices such as air conditioners and radio and TV transmitters.

Take note of the following information when planning where and how to install the FS-1600 Series NAS appliance.

#### **Warnings**

**Do not attempt to modify or use the supplied AC power cord if it is not the exact type required. A product with more than one power supply will have a separate AC power cord for each supply.**

**The power button on the NAS does not turn off AC power. To remove the AC power from the NAS, you must unplug the AC power cord from the wall outlet or power supply. The power cord is considered the disconnect device to the main (AC) power. The socket outlet that the NAS plugs into should be installed near the equipment and should be easily accessible.**

#### *2.1.1. Ambient Temperature*

The maximum operating temperature of the FS-1600 Series NAS appliance is 95°F (35°C) and the relative humidity of the NAS is in the range 8% to 90% (non-condensing). Careful consideration should be given to installing the NAS in an environment compatible with 95°F (35°C) maximum ambient temperature.

#### *2.1.2. Height and Weight*

Before installing the FS-1600 Series NAS appliance, make sure that the surface on which you are setting it is strong enough to bear its weight and accommodate its size.

- Dimensions (including front bezel): 17.2 (W) × 5.2 (H) × 25.5 (D) inches or (437 × 132 × 648 mm)
- Weight (approximately, depending on configuration): 72 lbs. (32.7 kg)

### ***2.1.3. Rack Mounting***

When mounting your FS-1600 Series NAS appliance into a cabinet (equipment rack), make sure you maintain correct mechanical load leveling to avoid hazardous conditions.

### ***2.1.4. Power Source***

The FS-1600 Series NAS appliance should be operated using only the type of power source indicated on the product label.

- Voltage: 100-240 V
- Current: 4-10 A
- Frequency: 50/60 Hz

### ***2.1.5. Circuit Overloading***

Appropriate consideration should be given when connecting the supply circuit to the FS-1600 Series NAS appliance to avoid any circuit overload. The system nameplate rating should be used when addressing concerns about circuit overload.

<p><b>Warning</b></p> <p><b>Make sure that the site has the necessary capacity to handle the FS-1600 Series NAS appliance. Overloading electrical supply circuits is extremely hazardous.</b></p>
---

### ***2.1.6. Reliable Grounding***

To avoid the potential for an electrical shock hazard, the rack assembly itself must be suitably grounded, according to your local regional electrical codes. This typically will require the rack to have its own separate ground. We recommend you consult your local approved electrician.

### ***2.1.7. Electrical Shock***

Do not operate the FS-1600 Series NAS appliance without the top cover in place. Opening or removing the cover may expose you to dangerous voltage and can cause electrical shock.

### ***2.1.8. Battery Precaution***

There may be a danger of explosion if the CMOS battery is incorrectly replaced. Replace this battery with model CR2032 only. Use of another battery may present a risk of fire or explosion. Dispose of used batteries according to manufacturer's instructions.

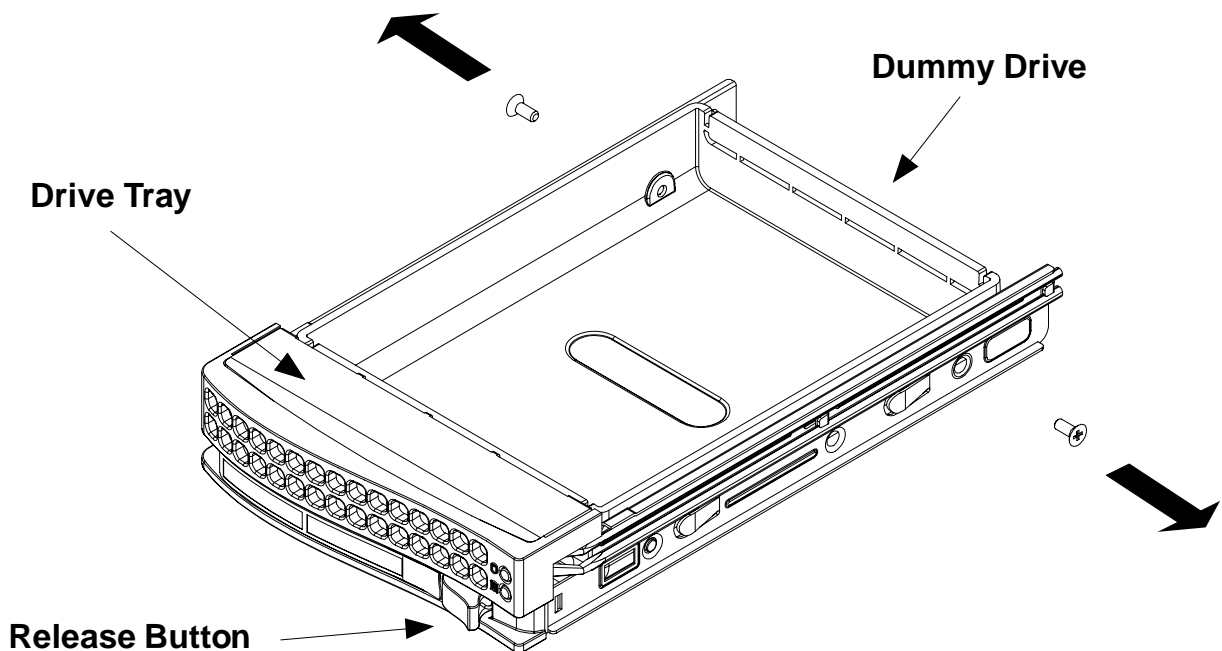
### 2.1.9. Sufficient Ventilation

The vents on the front panel and the fan openings on the rear panel provide ventilation for the FS-1600 Series NAS appliance. Make sure that these openings are not blocked and that adequate ventilation is provided where the unit is installed.

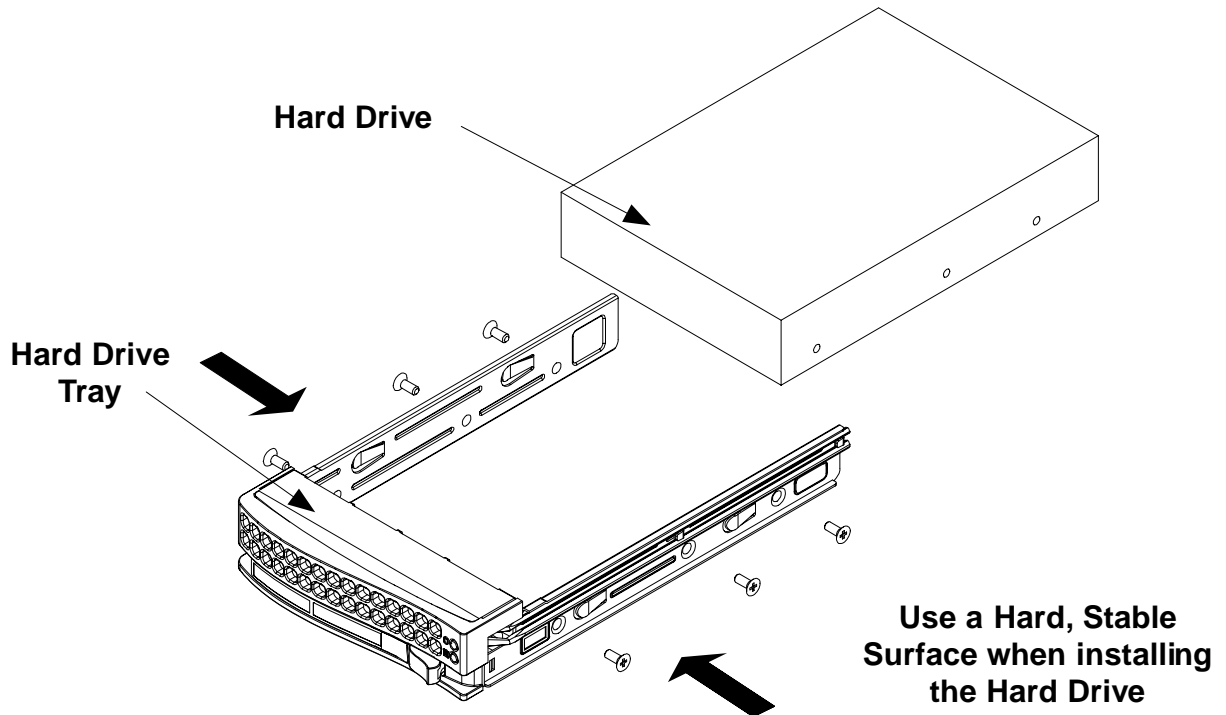
## 2.2. Accessing the HDD Tray & Installing Hard Drives

To install HDD to the FS-1600 Series NAS appliance, remove the drive tray from the chassis in order to mount any Serial-ATA I or II HDD.

1. Press the release tab to release the drive tray from its locking position.
2. Pull the drive tray out from the chassis by:
  - a. Pressing the tray handle release button.
  - b. Grab the tray handle and pull out the drive tray from the chassis.
3. Remove the 2 screws at each side of the dummy tray and take out the dummy tray as shown below:



- Slide the hard disk drive (HDD) into the tray and secure it with 3 screws on each side of the tray as shown below:



- Once the HDD is securely fastened to the tray, slide it back to the FS-1600 Series chassis.



## 2.3 Rack Installation: Content of Accessory Kit

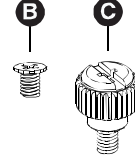
The following items are included in the accessory kit in every FS-1600 Series NAS appliance:

### M/B



A. Pan head w/ lock  
6-32 x 4.5 mm [0.177]

### HDD



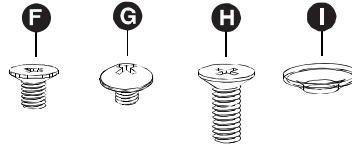
B. Flat head 6-32 x 5 mm [0.197]  
C. Thumb screw 6-32 x 5 mm [0.197]

### DRIVE



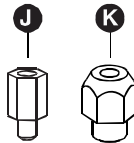
B. Flat head 6-32 x 5 mm [0.197]  
D. Pan head 6-32 x 5 mm [0.197]  
E. Round head M3 x 5 mm [0.197]

### RAIL



F. Flat head M4 x 4 mm [0.157]  
G. Round head M4 x 4 mm [0.157]  
H. Flat head M5 x 12 mm [0.472]  
I. Washer for M5

### M/B STANDOFF



J. M/B standoff, 6-32 to 6-32  
K. M/B (CPU) standoff, M5 to 6-32

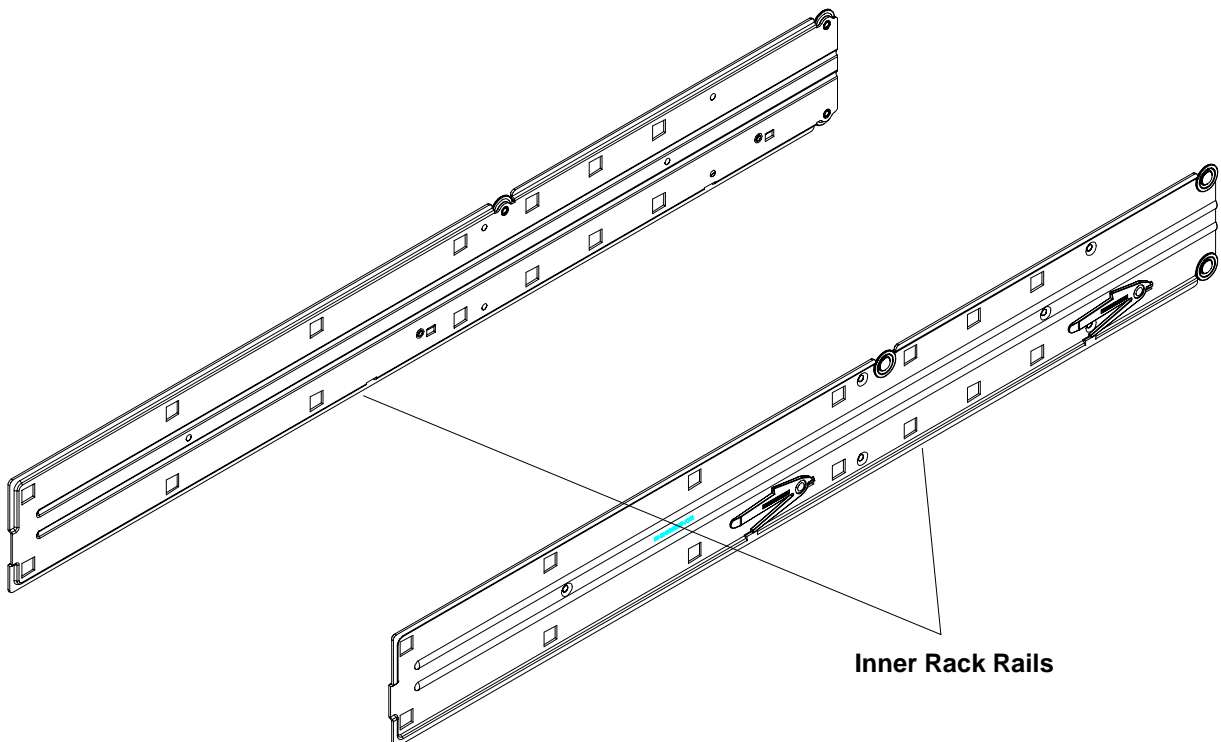
## 2.4. Rack Mount Installation

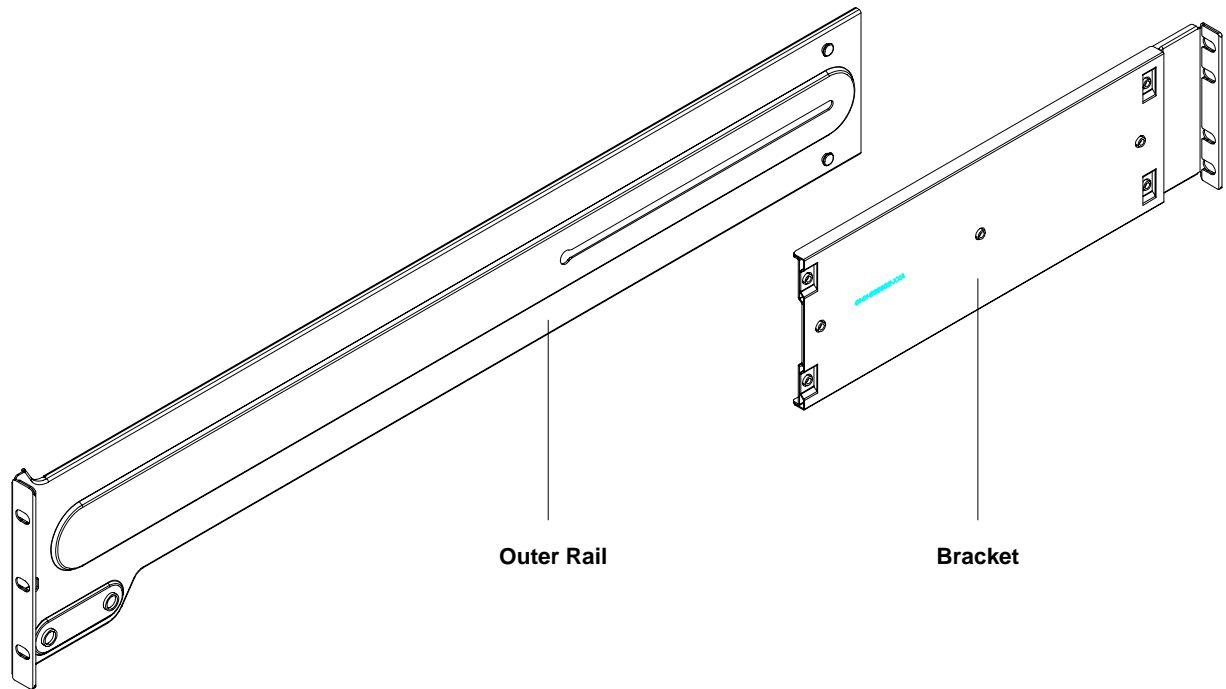
Before installing the FS-1600 Series NAS appliance, take the following precautions:

- The FS-1600 Series is heavy. To minimize the chances of injuries, make sure that two or more people help in installing the unit.
  - Do not place heavy objects on the FS-1600 Series NAS appliance.
  - Before installing, mark its intended position in the rack with a felt-tip pen. Mounting the appliance so it is not level could result in malfunctions.
  - There is one pair of inner rails to be installed on the FS-1600 Series chassis, one pair of outer rails to be installed in the rack and one pair of short brackets to be used on the rear side of the outer rails.
  - The rack mounting rails are designed to fit rack system with depth between 30 to 33 inches (762 to 838 mm).
1. Included in the shipping package is a pair of rail assemblies. Locate the inner and the outer rails for each rail assembly.
  2. Press the locking tab to release the inner rail from its locking position and pull it out of the rail assembly.

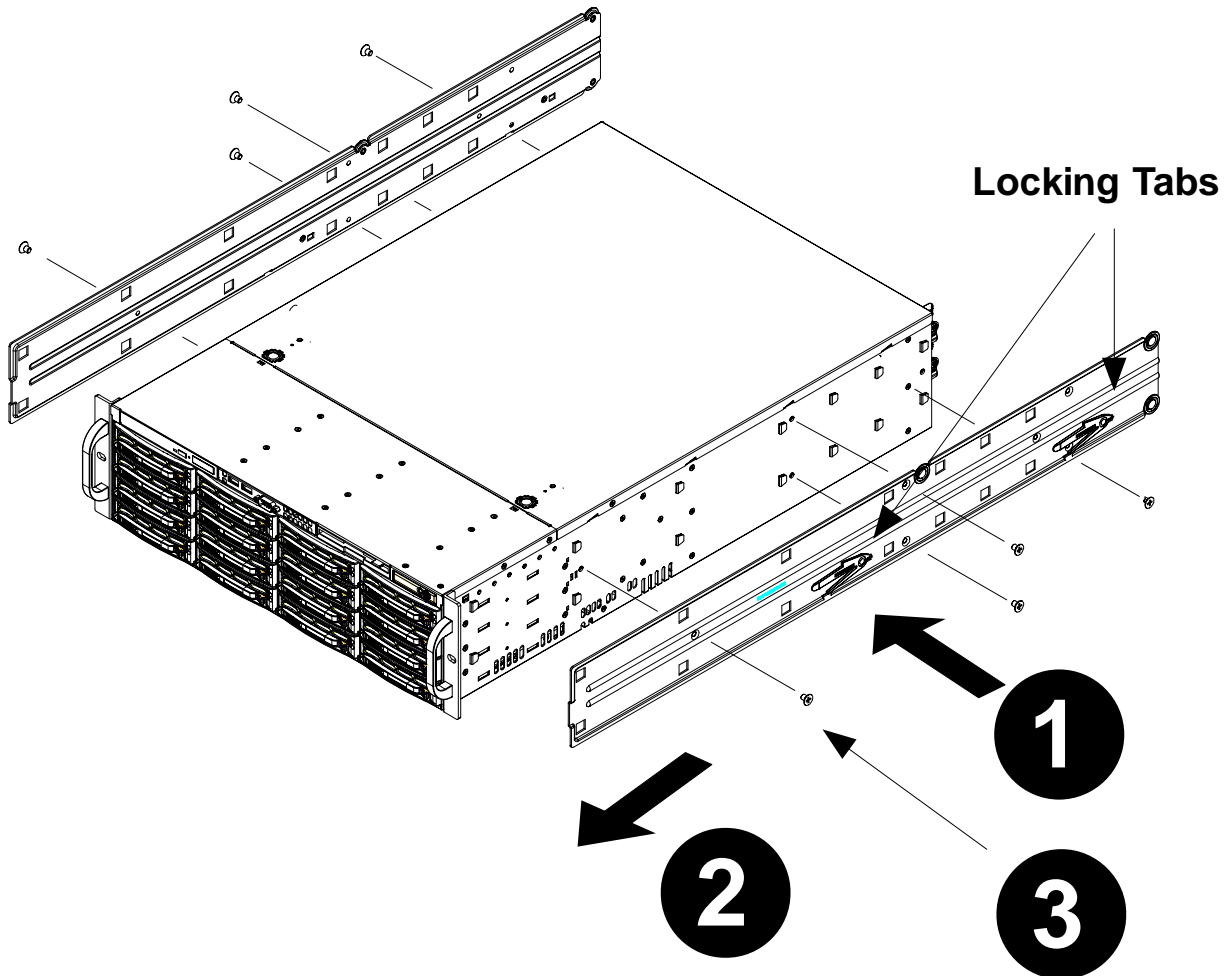
### Note

The inner rails are to be attached to the FS-1600 Series chassis and the outer rails are to be installed on the rack.



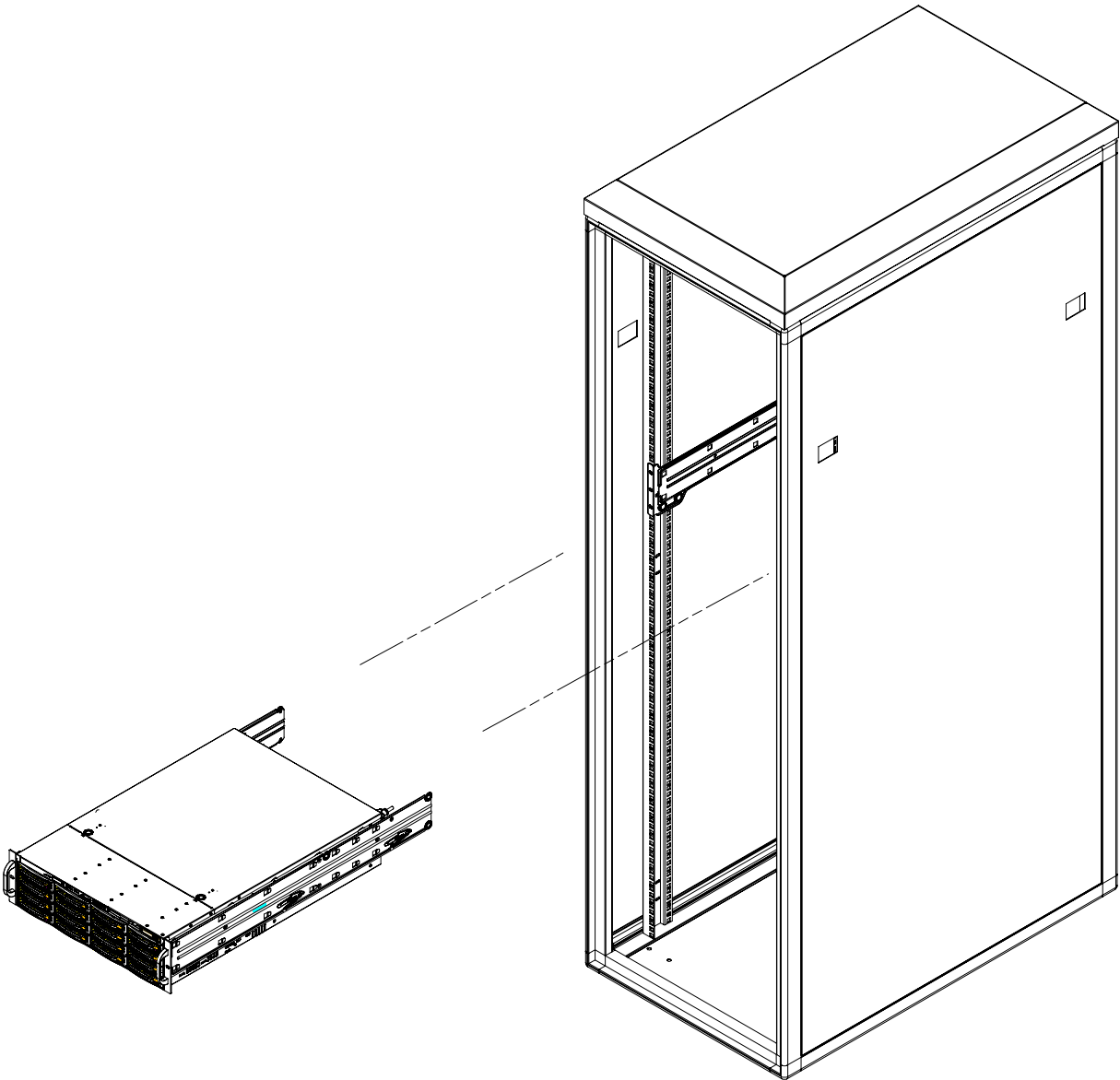


3. Place the inner rail on the side of the FS-1600 Series chassis, aligning the hooks (on chassis) with the locking holes of the inner rail. Slide forward inner rail towards the front of the FS-1600 Series chassis. Secure the inner rail to the FS-1600 Series chassis with the 4 screw as show in the diagram below.



4. Secure the inner rail to the FS-1600 Series chassis with Type G screw and repeat step 1 to 4 for the left rail on the chassis. (Refer to section 2.3 Rack Installation: Content for Accessory Kit for Type G screw.)
5. In the remaining package, locate the pair of outer rails and REAR brackets.
6. Secure the FRONT bracket of the outer rail with 2 x Type G screws. Slide the outer rail through the 2 buttons and attach the REAR bracket.
7. Measure the depth of your rack and adjust the length of the rail by sliding the bracket accordingly.
8. Repeat step 5 to 7 for the left outer rail.
9. Once the outer rail assemblies are built, they are ready to be installed on a rack. Use the Type I washer and Type H screw to secure the rail assemblies to a rack.

10. Once the rail assemblies are securely installed on the rack, align the FS-1600 Series inner rails with the grooves of the outer rail assemblies on the rack. Gently push the FS-1600 Series chassis inward till it fit nicely into the rack.



11. Secure the FS-1600 Series to the rack by tightening the screws on the front sides of the FS-1600 Series chassis.

## 2.4. Connecting Cables

Peripherals such as monitor, keyboard and mouse can be connected to the FS-1600 Series NAS appliance for direct administration. It is recommended to connect them when powering the appliance for the first time to ensure that hardware is functioning properly.

1. Connect the VGA monitor cable into the monitor/VGA port located on the rear panel of the FS-1600 Series NAS appliance.

2. Connect the PS/2 keyboard and mouse into the PS/2 keyboard and mouse ports on the rear panel of FS-1600 Series NAS appliance.

#### Notes

If USB keyboard and mouse are used, they can be connected on the rear panel of the FS-1600 Series NAS appliance.

3. Connect the power cord to the power connector located on the rear panel of the FS-1600 Series NAS appliance and connect the other end of the power cable to a power outlet.

## 2.5. Turning ON the Viking FS-1600 Series NAS Appliance

After making sure that you have set up the FS-1600 Series NAS appliance correctly and connected all the required cables, you can turn on you can turn on the appliance.

1. Press the power button. The FS-1600 Series NAS appliance starts and displays a welcome message. After that, a series of power-on self test (POST) messages appear. The POST messages indicate whether the appliance is running correctly.
2. If the appliance does not turn on or boot after pressing the power button, go to the next section for the possible cause of the boot failure.
3. Aside from the POST messages, you can determine if the NAS is in good condition by checking if the following occurred:
  - Power indicator on the front panel is green.
  - Num Lock, Caps Lock, and Scroll Lock LEDs on the keyboard are on.

#### Notes

The default login and password for Windows Storage Server 2003 is "**Administrator**" and "**1234**".

## 2.6. Troubleshooting

If the FS-1600 Series NAS appliance does not boot after you turn it on, check the following factors that might have caused the boot failure:

- The external power cable may be loosely connected. Check the power cable connection from the power source to the power cable connector on the rear panel. Make sure that the cable is correctly connected to the power source and to the power cable connector.

- No power comes from the grounded power outlet. Have an electrician check your power outlet.
- Loose or incorrectly connected internal power cables. Ask a qualified technician to assist you.
- For more troubleshooting steps, see section on “Troubleshooting”.

## 2.7. Turning OFF the Viking FS-1600 Series NAS Appliance

Do not use the power button to shut down the FS-1600 Series NAS appliance when powering down. When the appliance shuts down, all services running on it are forcibly terminated. Before shutting down the appliance, make sure no users are currently accessing the NAS. If you shut down the NAS while a file is being edited, the contents of the file may be damaged or corrupted.

The FS-1600 Series NAS appliance can be shutdown using the OS shutdown mechanism:

### 2.7.1. Using Microsoft® Windows®

On the Windows taskbar, click **Start, Shut Down**, then click **OK**. Wait for the FS-1600 Series to complete the shutdown process; you can then turn off all peripherals connected to your system.

- OR -

If your FS-1600 Series NAS appliance cannot receive input from the keyboard or mouse, press and hold the power button for at least four seconds. However, keep in mind that shutting down the NAS in this manner may damage the file system. If this happens, the file system will attempt to repair itself the next time the appliance starts (the larger the file system on the NAS, the longer time is required for system repair.) If the file system cannot repair itself, some or all of the data may be lost.



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# 3.

## *RAID Configuration*

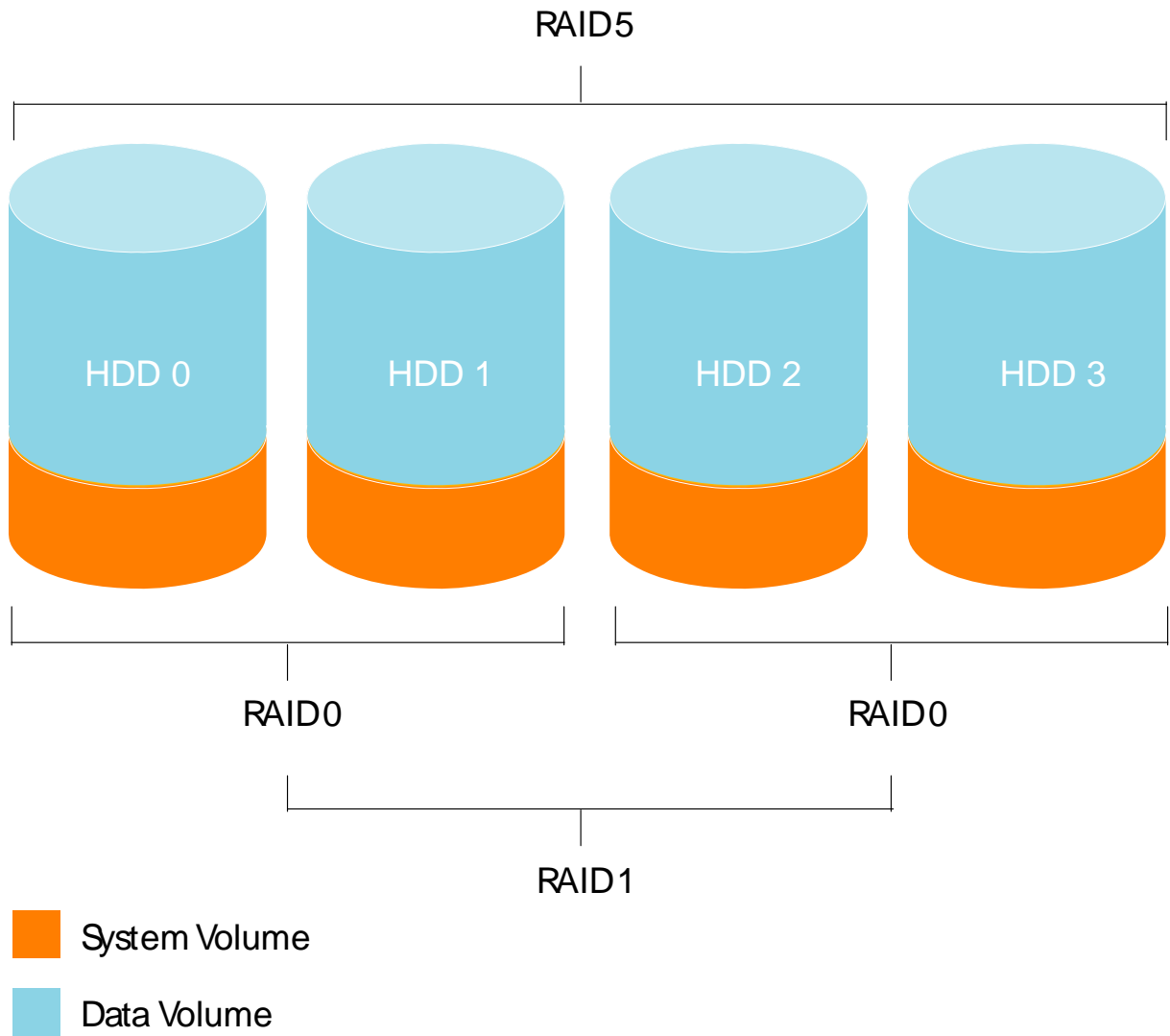
### 3.1. Hardware RAID Layout

The FS-1600 Series NAS appliance uses ARC-1160 (FS-1600) or ARC-1261ML (FS-1610) Serial-ATA RAID II controller that can aggregate a maximum number of 16 HDD into user definable RAID levels. The minimum number of required HDD is one (or RAID 0). Tandberg Data recommends using a minimum of 4 HDD (Serial-ATA II type) in order to kick start an implementation. Subsequent HDD can be added into an already configured RAID set or a new RAID set. Please refer to the respective sections in RAID controller User Guide for details.

Upon boot up of the FS-1600 Series NAS appliance, the RAID controller BIOS can be accessed by pressing the F6 or TAB key. It is recommended that a RAID set that comprises of a 4 HDD is created first before creating subsequent Volume sets.

In this case Tandberg Data recommends two logical Volume sets consisting of System Volume and Data Volume to be created within the RAID set. The two logical volumes are to be configured to RAID levels 0+1 and 5. The System Volume, installed with the host operating system (Windows® Storage Server 2003), is organized as RAID 0+1 and the Data Volume is organized as RAID 5. This is to allow OS redundancy if more than one HDD fails.

The Volume set layout for the appliance is illustrated below.



### 3.1.1. System Volume (SV)

This volume is organized as a RAID 0+1 volume. This volume includes the operating system image (Windows® Storage Server 2003). The minimum recommended size for this volume is 10 GB (default). The RAID level can be customized using the RAID controller BIOS or web-based RAID manager. The web-based RAID manager is only available after OS installation or recovery. For more information on how to use the RAID Volume Configuration utility, see “RAID Management” on 5.2.

### 3.1.2. Data Volume (DV)

The remaining hard drives space can be organized as the Data Volume using RAID 5 or other RAID level definable by user. For a FS-1600 Series NAS appliance installed with four 250 GB hard drives, the data volume size can be set to 735 GB using the recommended RAID and Volume settings.

## 3.2. RAID Volume Calculation

Depending on the hard drive capacity, the System Volume and Data Volume capacity can have different capacity sizes. A simple formula to calculate Data Volume size (DV) per RAID level is shown in the table below (where SV is the size of the System Volume in gigabytes) based on Tandberg Data's recommended settings:

RAID Level	Formula
5	$DV = \{[(\text{Per HDD capacity} \times 4) - 2 \times SV] \div 4\} \times 3$
0+1	$DV = \{[(\text{Per HDD capacity} \times 4) - 2 \times SV] \div 4\} \times 2$
0	$DV = (\text{Per HDD capacity} \times 4) - 2 \times SV$

Refer to the following table for changing the Data Volume of your hard drive or changing the default configuration setting according to your Data Volume size preference:

HDD Capacity (GB)	System Volume (GB)	Data Volume RAID 5 (GB)	Data Volume RAID10 (GB)	Data Volume RAID 0 (GB)
500	10	1485	990	1980
250	10	735	490	980

Use the Serial-ATA II RAID controller BIOS change the system volume size and RAID level of your hard drive. For more information, see “RAID Management” on 5.2.

The Serial-ATA II RAID controller also supports additional RAID level e.g. 6 and since the FS-1600 Series NAS appliance accommodates a maximum of 16 HDD, the flexibility of RAID configurations is up to the user entirely. Please see the Serial-ATA II RAID User Guide for more details.

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# 4.

## *Customizing the Viking FS-1600 Series NAS Appliance*

Before you install any computer component, we recommend that you read the following sections. These sections contain important ESD precautions along with pre-installation and post-installation instructions.

### **4.1. Preventing Static Electricity Discharge**

The components inside your computer are extremely sensitive to static electricity, also known as electrostatic discharge (ESD).

- ESD can permanently damage electrostatic discharge-sensitive components in your FS-1600 Series NAS appliance. Prevent ESD damage by following ESD guidelines every time you open the case.
- To avoid exposure to dangerous electrical voltages and moving parts, turn off your FS-1600 Series NAS appliance and unplug the power cord and network cables before opening the case.

Before opening the case, follow these guidelines:

- Turn off your FS-1600 Series NAS appliance.
- Wear a grounding wrist strap (available at most electronics stores) and attach it to a bare metal part of your computer.
- Touch a bare metal surface on the back of the computer.
- Unplug the power cord and the network cables.

Before working with computer components, follow these guidelines:

- Avoid static-causing surfaces such as carpeted floors, plastic, and packing foam.
- Remove components from their antistatic bags only when you are ready to use them. Do not lay components on the outside of antistatic bags because only the inside of the bags provide electrostatic protection.

### **4.2. Expanding Connectivity**

Ports allow you connect peripheral devices to your FS-1600 Series NAS appliance. For instructions on how to connect different external devices to the appliance, see your peripheral device user's guide for instructions.

### 4.2.1. *Built-in Networking*

The built-in network feature lets you connect your NAS to an Ethernet-based (10/100/1000 Mbps) network.

1. Connect an Ethernet cable from a LAN port (LAN0 or LAN1) on the rear of the FS-1600 Series NAS appliance to a RJ45 network jack, hub or switch on your network.
2. See your operating system user guide for information on how to configure your network settings.

### 4.2.2. *USB Connection*

The USB (Universal Serial Bus) port is a high-speed serial bus which allows connection to USB peripherals. The FS-1600 Series NAS appliance is equipped with two USB 2.0 ports located at the rear panel.

## 4.3. **Upgrading Storage Capacity**

The Viking FS-1600 Series NAS appliance delivers superior power and performance. However, some users and the applications they use may demand more computational resources. As such, this appliance lets you upgrade key components when you need increased performance or more storage space.

One of the key components of the FS-1600 Series NAS appliance is the hard drive. They can be changed and upgraded to meet performance and capacity requirements from time to time.

The FS-1600 Series NAS appliance used hot-swap Serial-ATA I or II HDD, they can be replaced without having to shut down the appliance.

<b>Warning</b>
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<p><b>Because all hard drives have different cooling power and vibration characteristics, specific hard drive types have been validated to be compatible with the NAS. For more information, contact Technical Support.</b></p>
---

### 4.2.2. *Removing/Installing Hot-Swap Hard Drive*

1. Identify the defective hard drive by reading the drive LEDs on the front panel. A defective drive LED does not light up. For information about the location of the drive status indicators, see "Front Panel Indicators".
2. Unlock the front bezel cover by inserting the supplied key into the lock and turning it counterclockwise until it points to the unlocked icon.

3. Remove the front bezel by pressing the release latch on right side of the front bezel, then pulling out the bezel.
4. Remove the defective hard drive by raising the hard drive carrier handle, then sliding the hard drive carrier out of the bay.
5. Install a new drive into the hard drive carrier. Make sure that the new hard drive is the same drive size as the failed hard drive.
6. Insert the hard drive carrier into the bay and lock it into place.
7. Replace the front bezel, then lock the control bay cover. The new hard drive's status LED lights up. The RAID will rebuild automatically.

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# 5. *System Management*

This chapter gives information about the software programs and utilities bundled with your Viking FS-1600 Series NAS appliance. Your appliance supports the following system management utilities:

- **Windows Installer.** This component of any Microsoft Windows operating system lets you install drivers for network, hard drive, and other component functions. For more information, see “Windows installer” on 5.1.
- **RAID Configuration.** This program lets you change the RAID configuration. For more information, see “RAID Management” on 5.2.
- **System Image Restoration.** This process recovers your appliance’s original factory default settings. For more information, see “System Recovery” on 5.3.

## 5.1. Windows Installer

The FS-1600 Series NAS appliance Windows operating system includes drivers and service support for network, hard drive, and other functions. For installation procedures, refer to the related README documents in the individual directories.

### Notes

The NAS is preinstalled with all the drivers and services necessary for the NAS to function correctly. This section is provided for software updates. If an upgrade or patched driver is available, you can refer to the information below to update the driver.

The Windows Installer includes the following components and drivers:

- Intel Network driver

Includes drivers and utilities to provide advanced NIC management functions such as fail over or aggregation. For more information, see the Intel Network driver's online Help.

- Disk/RAID driver

Provides performance improvement for the drive IO(s). You can update the driver using the Device Manager utility. In the SCSI and RAID controller device type option, select a device such as SATA PCI RAID Host Adapter to update your driver. For details on how to update a driver, see the Device Manager utility's online Help.

- SCSI driver

Additional IO bus for connecting SCSI peripherals. The driver is found under the Device Manager utility, under the SCSI and RAID controller device type option, Adaptec - Ultra320 SCSI.

## 5.2. RAID Management

The RAID volume of FS-1600 Series NAS appliance is configured using the BIOS of ARECA ARC-1160 or ARC-1261ML Serial-ATA II RAID controller hardware. Additional or subsequent configuration can be performed using the web-based RAID manager once the OS is installed.

### 5.2.1. Configure and Creation of RAID Volumes

The RAID BIOS Configuration Utility is used to create or configure the hardware RAID of FS-1600 Series NAS appliance. After any modification of the hardware RAID, the appliance has to be rebooted in order for the changes to take effect.

#### Notes

The RAID BIOS is accessed by pressing **TAB / F6** key during boot. The default BIOS password is "0000" when prompted.

Before restoring the factory default image to Viking FS-1600 Series NAS appliance, the System Volume (SV) on the hardware RAID controller must be created first. After the SV creation is finished, the appliance has to be rebooted to make the volume effective before the image restoration.

1. During the boot process, depress **TAB / F6** key to enter the RAID BIOS.
2. Create RAID set that comprises of the physical member HDD. If you have 4 HDD, you can select all 4 HDD into a RAID set.
3. Create the Volume set (SV) within the RAID set. Decide the RAID level and strip size of SV and the desire capacity.

#### Notes

It is recommended that the minimum capacity of the System Volume is set to 10GB and RAID level 0+1 for OS redundancy. Tandberg Data does not recommend setting the capacity value of SV below 10GB.

4. Enter the default password word if prompted.
5. The system will start performing the RAID volume creation. Depending on the capacity of the SV selected as well as its RAID level, this process may take several hours to complete. Once completed, the appliance has to be rebooted for the volume to take effect.

**Notes**

Further RAID configuration can be performed using web-based RAID manager after the OS is recovered using a web-browser and point to the following URL:

http://<your NAS appliance IP address>:81

The default user name is “**admin**”. The default password is “**0000**”.

6. Exit from the BIOS by pressing **F10** key and system will restarted.

For further detail on configuring RAID and Volume sets using the controller BIOS as well as using the web-based RAID manager, see ARECA ARC-1160/ARC-1261ML Serial-ATA RAID Controller User Manual.

### 5.2.2. *Changing RAID Level and Capacity Size*

The RAID BIOS and web-based RAID manager are also used to change the RAID level as well as the capacity size of the configured volumes. After the creation of the System and the Data Volume, further alteration to their RAID level and capacity is allowed via these means.

1. Access either the RAID BIOS or the web-based RAID manager, see details in section 5.2.1.

**Notes**

See the ARECA ARC-1160/ARC-1261ML Serial-ATA RAID Controller User Manual for further details.

2. The ARC-1160/ARC-1261ML Serial-ATA RAID controller will perform the configuration change once confirmed. Depending on the extend of change the process may take a few minutes to several hours to complete. The appliance must be rebooted for the change to take effect.

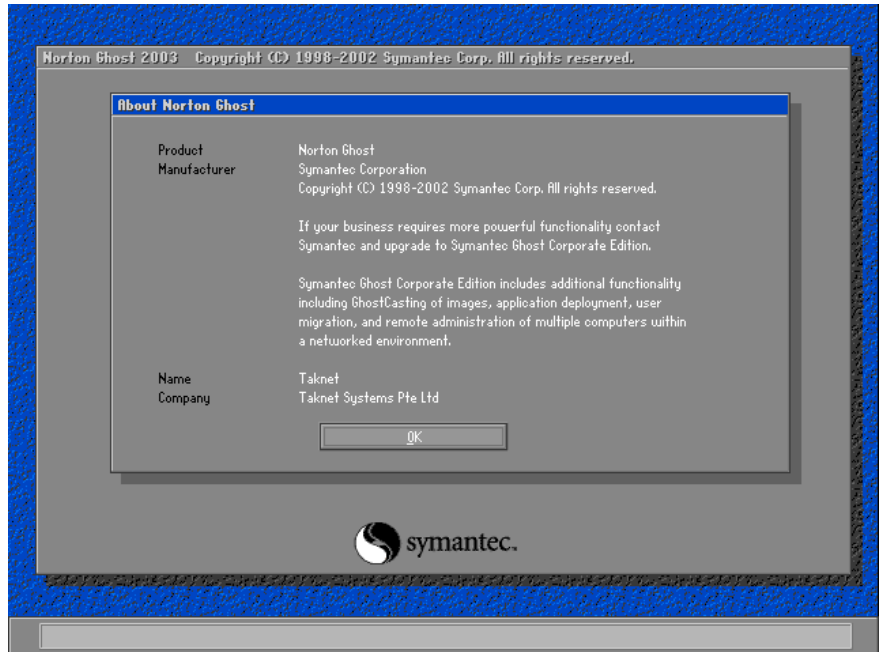
## 5.3. System Recovery

The Image Restoration lets you restore the system image factory default settings.

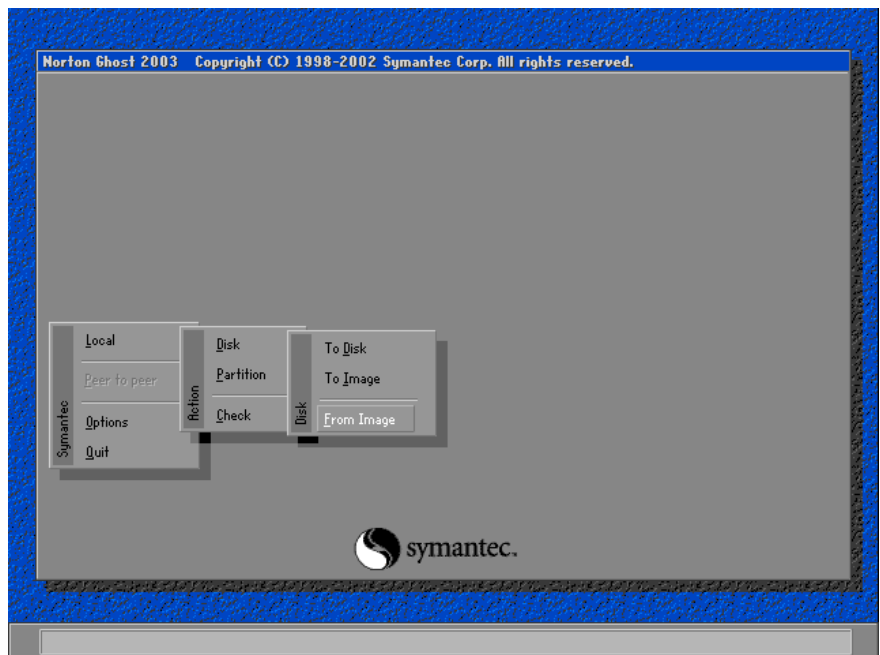
**Notes**

Using the Image Restoration utility removes all data on the System Volume. Make sure that you back up important files before starting the restoration process. Image restoration can only be performed after System Volume has been created.

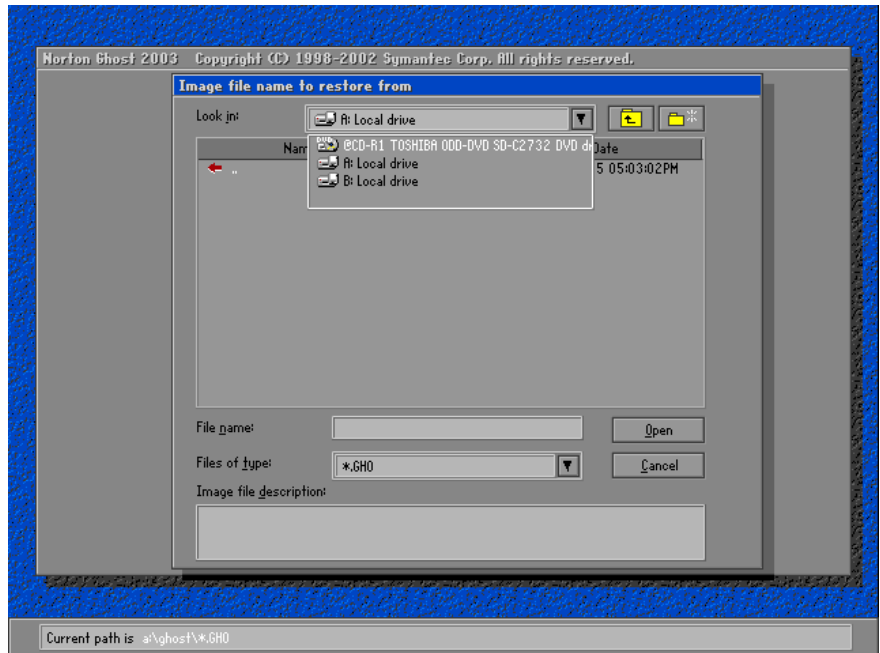
1. Insert the Recovery DVDROM disc into the DVDROM drive and boot to the FS-1600 Series NAS appliance. Hit any key to perform CD or DVDROM booting when prompted.
2. PC DOS will boot and Symantec GHOST 2003 will be loaded.



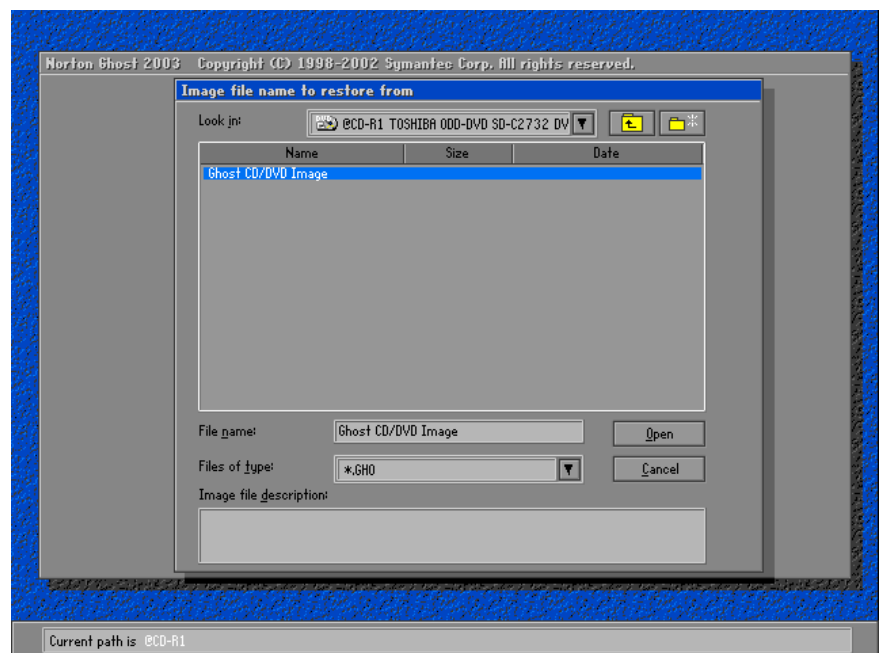
3. Click **OK**.
4. Select Yes **Local > Disk > From Image**.



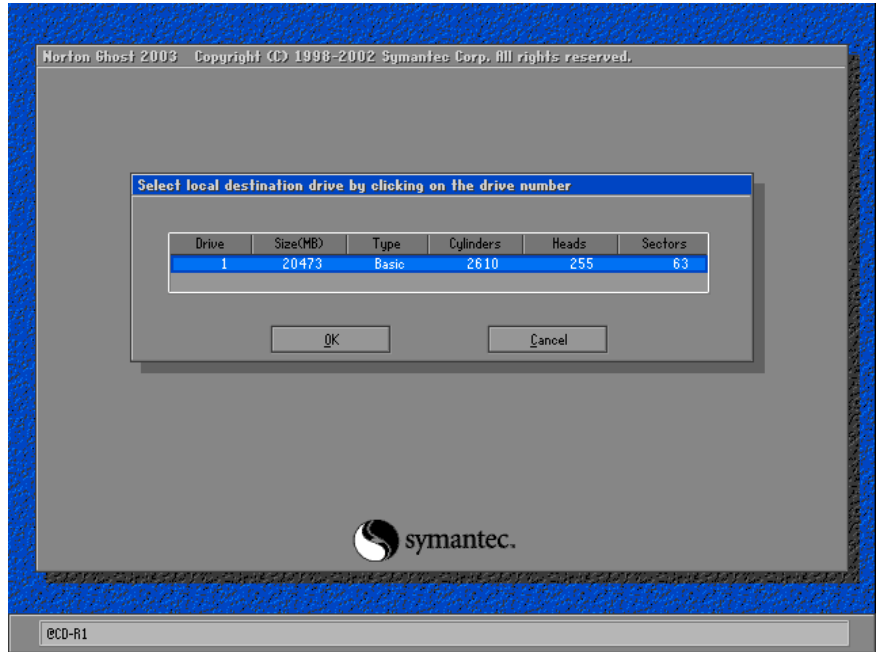
5. Select DVDROM drive from the **look in** drop down box.



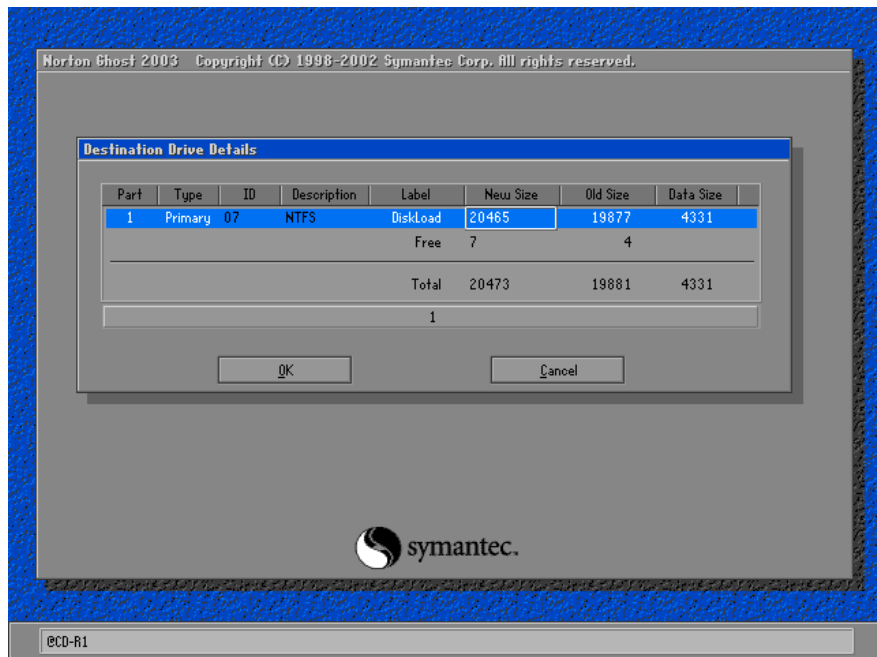
6. Select the GHOST Image listed.



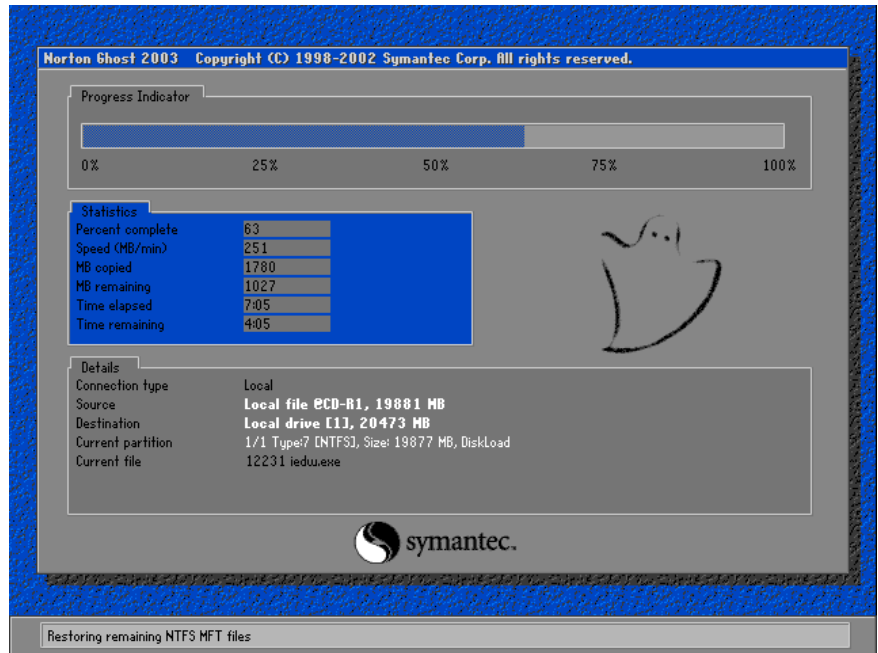
7. Select local destination drive by choosing it from the pop-out window.



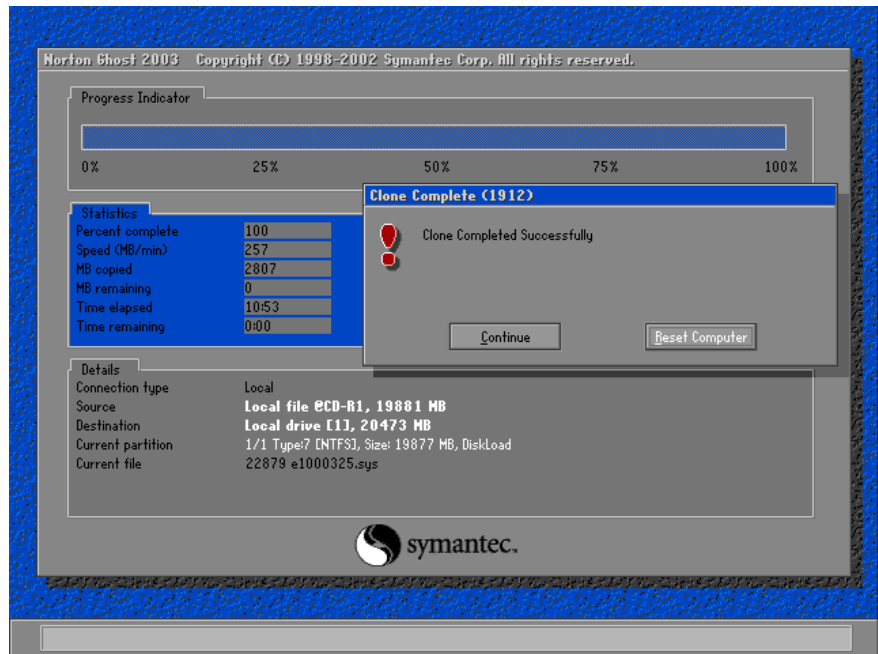
8. Verify detail of the destination drive.



9. Click **OK** and the restoration will commence.



10. Once the restoration has completed, click **Reset Computer** to boot the FS-1600 Series NAS appliance to the new OS image.



11. Follow the Windows® setup to configure the Product Key, server Name, Administrator password and reboot.



**Notes**

Please note that in order to restore the image into the Viking FS-1600 Series NAS appliance successfully, you should create the System volume and reboot the appliance first prior to the restoration.

**Notes**

The default login and password for Windows Storage Server 2003 is “**Administrator**” and “**1234**” despite the initial user specified configuration. The user logon credential is hard-coded to the recovery image.

Default login password can be changed once the OS boots normally.

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# 6. *Troubleshooting*

## 6.1. Before Calling Tandberg Data Technical Support

If you have a technical problem with your Viking FS-1600 Series NAS appliance, follow these recommendations before contacting Tandberg Data Technical Support:

- Make sure that your FS-1600 Series NAS appliance is connected correctly to a grounded AC outlet that is supplying power.
- If a peripheral device, such as a keyboard or mouse, does not appear to work, make sure that all cables are plugged in securely and plugged into the correct port or jack.
- If you have recently installed hardware or software, make sure that you have installed it following the instructions provided with it. Please refer to the manufacturer's documentation and technical support resources.
- If you have "how to" questions about using a program, see:
  - The program's online Help
  - The program's documentation
  - Your operating system's documentation
  - The software or hardware manufacturer's Web site
- Have your client ID, serial number (located on the side or back of your case), and order number available, along with a detailed description of your issue, including the exact text of any error messages, and the steps you have taken.
- Make sure that your FS-1600 Series NAS appliance is nearby at the time of your call. The technician may have you follow appropriate troubleshooting steps.
- Consider using Tandberg Data's online technical support. Tandberg Data's Web site has FAQs, tips, and other technical help. You can also use the Web site to e-mail Technical Support. For more information, visit Tandberg Data's web site at [www.tandberg.com.sg](http://www.tandberg.com.sg).

## 6.2. Safety Guidelines

While troubleshooting your Viking FS-1600 Series NAS appliance, follow these safety guidelines:

- Never remove the top cover while your appliance is turned on and while the network cable and the power cords are connected.
- Make sure that you are grounded correctly before opening the appliance. For more information about preventing damage from static electricity, see “Preventing static electricity discharge” on 4.1.
- After you complete any maintenance task where you have to remove the top cover, make sure that you close the case and reconnect all cables before you restart your appliance.

### **Warning**

**To avoid bodily injury, do not attempt to troubleshoot your FS-1600 Series NAS appliance problem if:**

- 1) The power cords or plugs are damaged**
- 2) Liquid has been spilled into your appliance**
- 3) Your FS-1600 Series NAS appliance was dropped**
- 4) The case was damaged**

**Instead, unplug your NAS and contact a qualified computer technician. If your FS-1600 Series NAS appliance was damaged during shipment from Tandberg Data, contact Tandberg Data Technical Support.**

## 6.3. Troubleshooting Steps

The Viking FS-1600 Series NAS appliance does not work.

- Make sure that the power button on the front panel is turned on.
- Make sure that the power cable is connected correctly.
- Turn off the FS-1600 Series NAS appliance by pressing the power button, and then restart again. During the startup procedure, the appliance checks the file system. The length of this check varies depending on the amount of data on the appliance (in some extreme cases, it can take as long as two hours).

The Viking FS-1600 Series NAS appliance cannot be accessed from a browser.

- Make sure that the network cable is connected correctly.
- Make sure that the LINK LED and ACT LED are lit.
- Make sure that the IP address entered on the browser is correct.
- Make sure that no other networked device is using the same IP address as the appliance.
- Make sure that the network cable is not damaged.
- Make sure that there is no problem with the connection between the network hub and the computer, appliance, or hub connectors.

The FS-1600 Series NAS appliance cannot read the CD/DVD information.

- Make sure that you are using the correct type of disc.
- Make sure the CD/DVD is correctly inserted in the drive.
- Make sure that the CD/DVD is clean and is not scratched.

A new peripheral is not working correctly.

- Make sure that the cables for the new peripherals are firmly connected and that the pins are not bent.
- See the documentation that came with the new peripheral to see if any device drivers need to be installed.
- Make sure that the network status indicator lights up.
- Check the cabling and network equipment for the correct connection.
- Reinstall the network drivers.

A peripheral device connected to a USB connector does not work.

- Reduce the number of external devices connected to a USB hub.
- See the documentation that comes with the device.

FS-1600 Series NAS appliance cannot eject disc drive tray

- Insert the tip of a straightened paper clip into the manual eject hole of the disc drive tray.

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# 7.

## *Glossary*

### **10 Base-T**

A UTP cable consisting of four pairs of two wires (8 conductors) each, twisted together into a single unshielded set (the cable is not enclosed in a metallic mesh for blocking electromagnetic noise). Also referred to as a twisted pair cable, it is commonly used for connection in Ethernet-based local area networks.

A cable of this type is capable of carrying unmodulated signal data at the rate of 10 megabits per second over distances of up to 328 feet (100 meters) (with the 10 Mbps base band system).

### **100 Base-TX**

A UTP cable consisting of four pairs of two wires (8 conductors) each, twisted together into a single unshielded set (the cable is not enclosed in a metallic mesh for blocking electromagnetic noise). This is referred to as a twisted pair cable. These cables meet the category 5 specifications for such cables.

A cable of this type is capable of carrying unmodulated signal data at the rate of 100 megabits per second over distances of up to 328 feet (100 meters) (with the 100 Mbps base band system). It is used for connecting to local area networks using fast Ethernet, which operate at speeds in excess of 10 Mbps (data transfer at the rate of 10 megabits per second).

### **Capacity limit**

Limits the amount of drive space that a particular user can use. Also referred to as a quota or disk quota.

### **DHCP (Dynamic Host Configuration Protocol)**

A protocol for easily assigning dynamic IP addresses to devices on a network. With DHCP, IP addresses can be traced by the software without requiring an administrator to manually manage the task.

**Event Viewer**

An administrative tool that is used to view and manage logs of system, program, and security events on your NAS. The Event Viewer displays five types of events:

- **Error**  
An error log describes a significant problem that has occurred, such as a loss of data or loss of functionality.
- **Warning**  
A warning log indicates a potential problem in the future.
- **Information**  
An information log describes operation of an application, driver, or service.
- **Success audit**  
A success audit event is a user's successful attempt to log on to the NAS.
- **Failure audit**  
A failure audit log is a failure to access a network drive.

**Hub**

A switching device through which a number of devices (such as computers) can be connected to a network. Since connected devices are arrayed with the hub at the center, this type of connection is referred to as a star topology. Most hubs used with the Internet are equipped with a signal amplifier (repeater) to support physical extensions.

**IP address**

An identifier used to indicate the addresses of devices (such as computers) that are connected to a network. Because this identifier is used to designate a particular destination during data exchange, each IP address must be unique. The address consists of four period-delimited fields, each field being a number from 0 to 255.

**LAN (Local Area Network)**

A network encompassing a relatively limited area, such as a building, a floor, an organization, or a company.

**LED (Light-Emitting Diode)**

A diode that emits light and is used as a status indicator.

**Log**

A record of events occurring during operation, along with their times of occurrence, or the file containing such a record. For example, an error log contains a list of errors occurring in the NAS appliance, while an access log records access to the NAS appliance.



**Mount**

To make accessible, either by connecting to the computer itself or by placing onto the hard drive or other storage medium of a computer on the network.

**Network card**

A device installed in a computer or router to enable connection to a network. A network card is equipped with a port (connector) for connection to a 1000 base-T, 100 Base-TX, 10 Base-T, or other network cable. Also referred to as a LAN card, LAN board, or NIC (network interface card).

**Network system**

A system for sharing resources such as files and printers.

**NFS (Network File System)**

A method for sharing files over a network. NFS makes it possible to use files located on another computer on the network as if they were located on your own machine. A trademark of Sun Microsystems, it is primarily used with UNIX, but has also been adapted for use with Microsoft Windows operating systems.

**Operating system**

Basic software that manages and controls operation of a computer. Microsoft® Windows® and UNIX are operating systems.

**RAID**

RAID (redundant array of independent disks) is an array of multiple, independent hard drives that provide high performance and fault tolerance. The RAID subsystem controller implements several levels of the Berkeley RAID technology. An appropriate RAID level is selected when the volume sets are defined or created. This decision is based on drive capacity, data availability, (fault tolerance or redundancy), and drive performance.

**RAID level**

RAID level refers to the level of data performance and protection of a volume set. RAID arrays can be implemented in several ways, using technologies such as mirroring, striping, duplexing, and parity. The RAID levels supported in the RAID subsystem are RAID 0, RAID 1, RAID 10 and RAID 5.

**RAID 0**

RAID 0, also known as striping, is the simplest RAID level. RAID 0 does not involve data redundancy, but it does offer the best high-speed data throughput. RAID 0 breaks up data into smaller blocks, then writes a block to each drive in the array.

**RAID 1**

RAID 1, also known as disk mirroring, writes data simultaneously to several duplicate drives. If one drive fails, the other drive(s) continues to function as a single drive until the failed drive is replaced.

**RAID 5**

RAID 5 is also known as striping with parity at byte level. In RAID 5, both data and parity information are written to all of the drives in the subsystem. If one drive in the system fails, the parity information can be used to reconstruct the data from that drive. All drives in the array system can be used for a seek operation at the same time, thereby increasing the performance of the RAID system.

**RAID 6**

RAID 6 provides the highest reliability, but is not yet widely used. It is similar to RAID 5, but it performs two different parity computations or the same computation on overlapping subsets of data. RAID 6 can offer fault tolerance greater than RAID 1 or RAID 5 but consumes the capacity of 2 disk drives for distributed parity data. RAID 6 is an extension of RAID 5 but uses a second, independent distributed parity scheme. Data is striped on a block level across a set of drives, and then a second set of parity is calculated and written across all of the drives.

**RAID 10**

RAID 10 is a combination of RAID 0 and RAID 1, striping and disk mirroring. RAID Level 10 combines the fast performance of Level 0 with the data redundancy of Level 1. In this configuration, data is distributed across several drives, similar to Level 0. Then the data are duplicated to another set of drives for data protection. RAID 10 provides the highest read/write performance of any of the hybrid RAID levels.

**RAID 0+1**

RAID 0+1 is a mirrored array whose segments are RAID 0 arrays. It has the same fault tolerance as RAID 5, and the same overhead for fault tolerance as mirroring alone. This RAID has excellent performance, but not maximum reliability.

**Rack mount**

Ordinarily, a 19-inch rack (cabinet) in which servers or drive units made to fit such a rack are mounted. A rack mount kit is hardware, such as sliding rails, for mounting devices in such a rack.

**Router**

A repeater for connecting multiple networks. A router determines the optimum path (route) for forwarding received data, and provides control over a higher level of processing than a device such as a hub. A router is used in constructing medium- to large-scale networks.

**Server**

A computer that provides many types of services to computers attached to it. Examples include file servers, Web servers, and data servers.

**Service**

A task (sometimes known as a process) or application that resides in the system and runs in the background. Also referred to as a daemon or driver.

**Subnet mask**

A number that is used for dividing IP addresses used on a TCP/IP network into network numbers and host numbers. This method is used to allow different networks that are connected through a router to recognize that they are different networks.

**TCP/IP protocol**

Generally used to refer to the established set of means and procedures by which devices connected to a TCP/IP network communicate with one another. TCP/IP is the most widely used of the various protocols, and is also used on the Internet.

**Volume set**

Volume set is a single logical device. It is organized in a RAID level with one or more physical drives. A volume set must be created either on an existing RAID set or on a group of available individual drives.

**Web server**

A server machine that distributes data for viewing over the Web, or the service provided by such a machine. Also referred to as a WWW (World Wide Web) server.

**Windows network**

A network built from machines that use a Microsoft® operating system. Uses a protocol called NetBEUI.

**Windows Administrative tools**

A collection of Windows tools (Component Services, Computer Management,

Data Sources, Event Viewer, Local Security Policy, Performance and Services) for remotely managing a server from a computer running Windows.

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